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Gregory H. Boyce  
Director, Environmental Affairs

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DIVISION OF  
OIL, GAS & MINING

**Kennecott**

December 9, 1986

Dr. Dianne R. Nielson  
Director  
Division of Oil, Gas and Mining  
Utah Department of Natural Resources  
365 West Temple  
Three Triad Center, Suite 350  
Salt Lake City, Utah 84150

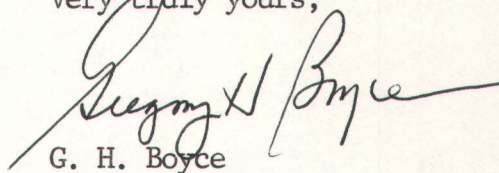
Re: Utah Modernization Project  
Mining and Reclamation Plan Amendment to Relocate  
Flotation and Molybdenum Recovery Facilities

Dear Dr. Nielson:

Enclosed for your review and approval is Kennecott's application to amend the UCD Mining and Reclamation Plan to relocate the flotation and molybdenum recovery facilities to the Copperton grinding plant site. The decision to relocate these facilities to the Copperton site was made by Standard Oil on December 2, 1986, based on recently completed optimization studies. All of the facilities described in this amendment application are additional to the facilities approved in the Division's letter of September 23, 1986. All of the facilities covered in the September 23 letter will be constructed as approved and without modification.

Please contact Al Trbovich (801/322-8263) if you require additional information or clarification about this amendment.

Very truly yours,



G. H. Boyce

/mf  
Enclosure

cc: L. K. Jacobson, w/enc.  
R. J. Ramsey, w/enc.  
V. R. Rao, w/enc.  
A. M. Trbovich, w/enc.  
J. B. Winter, w/enc.

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0002

ACT/035/002-II(a)  
(1 set of maps)  
(1 map)  
attached

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Permit Application Package

Utah Copper Division

**DIVISION OF  
OIL, GAS & MINING**

Flotation and Molybdenum Recovery Facilities Relocation

Introduction and General Information

On December 2, 1985, Kennecott applied to the Utah Division of Oil, Gas and Mining (DOGM) for an amendment to our existing mining and reclamation plan for the Utah Copper Division operation. The proposed changes reflected Kennecott's plans to modernize the Utah facilities by installing inpit crushing of ore, conveying of ore to a new grinding plant approximately one mile north of Copperton, the grinding plant, a pipeline to transport the ground ore (flotation feed) to the existing Arthur and Magna flotation facilities and a second pipeline to return process water for the grinding plant. On September 23, 1986, DOGM issued final approval for all aspects of the mining and reclamation plan amendment.

During 1986, Kennecott has investigated several alternatives for modernizing the flotation and molybdenum recovery facilities of UCD. The selected alternative involves constructing a new flotation plant, molybdenum plant and ancillary facilities at the Copperton grinding plant site. These new facilities will replace the existing Magna concentrator and Arthur concentrator equipment. The existing tailings pond near Magna will continue in use.

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All of the facilities approved by DOGM on September 23, 1986, will be constructed as previously described and approved. The ore slurry pipeline will be utilized as a tailings pipeline. No other changes to the previously approved specifications are envisioned. The facilities described in this amendment application represent an add-on program to optimize the UCD operation.

#### Site Location and Conditions

The Utah Copper Division flotation and molybdenum recovery plant will be located at the Copperton grinding plant site in the SW 1/4 of Section 5 and the SE 1/4 of Section 6, T3S, R2W, SLBM. The combined plant will be known as the Copperton concentrator. The new facilities will be located entirely within the area permitted in the September 23, 1986 approval.

A third pipeline will be constructed in the approved corridor. This buried five inch diameter steel pipeline will be used to transport concentrate from the Copperton plant to the smelter. The approved corridor traverses portions of Section 5 and 6 T3S, R2W; Section 6, 7, 8, 16, 17, 21, 28, 29 and 32, T2S, R2W; and Section 31, T1S, R2W, SLBM.

General site conditions of the area were presented in "Permit Application Package, Utah Copper Division Modernization Project, Phase II - Grinding Plant, Ore Conveyor and Flotation Feed Pipeline", submitted on April 28, 1986, and will not be repeated here.

## New Facility Description

The facilities to be constructed within the flotation/molybdenum plant scope include a new flotation plant, a new molybdenum recovery plant and a new concentrate pipeline. In addition, the flotation feed pipeline will be utilized as a tailings pipeline to the existing Magna tailings pond. Detail about these facilities is provided below. Enclosed Drawing 712-SKC-346, Full Concentrator Site Plan, gives the location of the proposed facilities.

## Flotation

Bulk flotation will be conducted to separate the copper and by-product minerals from the non-value material. Flotation will be conducted in approximately 63 flotation cells, each having a capacity of either 3,000 cu ft, 1,000 cu ft, or 500 cu ft.

The first step of the flotation process, the rougher scavenger circuit, will consist of three rows of eleven 3,000 cu ft flotation cells. Pulp from any of the three grinding lines will be split between the three rows by a distributor. Flotation reagents will be added at the head of the three-way distributor. In any one row, the first four cells will obtain a 16% copper rougher concentrate and the last seven cells will obtain a 2% copper scavenger concentrate.

Rougher concentrate and scavenger concentrate obtained from the rougher scavenger circuit will be cleaned in separate cleaner circuits. Rougher concentrate will report directly to the rougher cleaner circuit. The

two rows of five cells each will produce final copper-molybdenum concentrate without regrinding.

Scavenger concentrate will be combined with rougher cleaner circuit tailings and cleaner scavenger concentrate. The combined stream will be reground in one regrind ball mill. Pulp from the ball mill will be processed through the scavenger cleaner flotation circuit, consisting of two rows of ten cells each. The first two cells of each row will produce final copper-molybdenum concentrate. The last five cells in each row will produce cleaner scavenger concentrate which will be recycled back to the regrind circuit. The remaining three cells in each row are intermediate steps.

Final concentrate from the rougher cleaner and scavenger cleaner circuits will be directed to the molybdenum recovery plant. Tailings from the rougher scavenger circuit and the scavenger cleaner circuit will be directed to the pipeline facility.

#### Molybdenum Recovery Plant

The copper-molybdenum concentrate entering the molybdenum recovery plant will be thickened and directed to two storage tanks. These tanks will provide surge capacity to minimize flow and density variations. The stored concentrate will be pumped to an agitated feed conditioner tank for flotation reagent addition. Molybdenite will then be separated from the copper-molybdenum concentrate in one row of four flotation cells.

The tailings material from this step represents the final copper concentrate. The molybdenite concentrate will next be processed through a rougher cleaner flotation circuit and thickened in preparation for heat treatment.

The purpose of heat treatment is to burn off reagents and to slightly oxidize the particle surfaces so that insoluble gangue can be separated from the molybdenite. The thickened molybdenite concentrate will be dewatered in disc filters and then "bone dried" in one indirect heated screw drier. The dried material will be heat treated in a rotary kiln.

The "bone drying" and heat treating process produces a particulate emission. The heat treating procedure also generates sulfur dioxide. Sulfur dioxide scrubbing and dust collection will be provided. Natural gas will be the primary fuel for all thermal operations.

The heat treated concentrate will be repulped, cooled and floated in two stages of cells for gangue removal. The gangue stream will be scavenged for recovery of any remaining value and then discharged to the copper concentrate thickeners. After removal of the gangue material, the resulting molybdenite concentrate will be recleaned in several flotation steps to produce a final concentrate. The final concentrate will be directed to the cyanide leach circuit.

The object of the cyanide leach circuit is to remove residual copper from the final molybdenum product. Following the leach circuit, the product is washed, filtered, dried and packaged for shipment.

### Tailings Pipeline

Final flotation tailings will be directed by gravity to the tailings pipeline. The tailings pipeline will transport the tailings to the existing UCD tailings pond. The previously approved ore slurry pipeline will be utilized without change as the tailings pipeline.

### Copper Concentrate Pipeline Filter Plant

Copper concentrates slurry will be pumped to the smelter through a five inch steel pipeline. At the smelter, the concentrate will be dewatered in a filter plant and then to the existing smelter feed handling system.

### Other Permitting Agencies

The Utah Bureau of Air Quality (BAQ) is responsible for reviewing all aspects of the flotation relocation project for potential air quality impacts. Kennecott is installing the necessary emission controls to meet the applicable New Source Performance Standards (NSPS) and Best Available Control Technology (BACT) provisions. Mr. Don Robinson of BAQ is this agency's contact for the modernization project. The information submitted to BAQ for review and approval will not be repeated here.

The Utah Bureau of Water Pollution Control (BWPC) is responsible for reviewing all aspects of the flotation relocation project for potential surface and groundwater quality impacts. Kennecott is installing the

necessary controls to assure that there is not adverse water quality impact from the relocated facilities. Mr. Byran Elwell of BWPC is this agency's contact for the modernization project. The information submitted to BWPC for review and approval will not be repeated here.

#### Final Reclamation Plan

The final reclamation plan for the Copperton site will be unchanged from the plan approved on September 23, 1986. This plan will not be repeated here. However, the inclusion of additional facilities at the site does mandate an increased bond for final reclamation. Kennecott has calculated this increase to be \$1,643,000 over the existing bond of \$6,483,525, for a total bond of \$8,126,525. Detail on the derivation of this new bond figure is provided in Tables 1 through 13.

TABLE 1  
 SITE RECLAMATION ESTIMATE FOR BOND ESTIMATING  
 FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>  |                           |
|--|---------------------------|
| Demolish and Dismantle Structures<br>(See Table 2 through 12 for detail) | \$ 956,000                |
| Load and Ship Material<br>(See Table 13 for detail)                      | \$ 538,000                |
| Prepare and Plant Site   | Included in existing bond |
| Subtotal   | \$1,494,000               |
| Contingency (10%)  | \$ 149,000                |
| Total  | \$1,643,000               |

Note: Total does not include \$500,000 credit for salvage value.

TABLE 2

DEMOLITION AND DISMANTLING ESTIMATE FOR BOND ESTIMATING  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>             | <u>Quantity</u> | <u>Manhours</u> | <u>Cost</u> |
|-------------------------|-----------------|-----------------|-------------|
| Earthwork               | 50,000 cy       | -               | \$ 26,000   |
| Concrete                | 4,520 cy        | 5,400           | \$108,000   |
| Steel                   | 2,063 cy        | 8,300           | \$166,000   |
| Building Finish         | 1 lot           | 4,000           | \$ 80,000   |
| Tanks                   | 950 st          | 4,000           | \$ 80,000   |
| Plant Equipment         | 2,460 st        | 11,900          | \$238,000   |
| Piping                  | 430 st          | 3,400           | \$ 68,000   |
| Electrical Equipment    | 1 lot           | 5,700           | \$114,000   |
| Cable Trays and Conduit | 108,700 lf      | 1.300           | \$ 26,000   |
| Wire and Cable          | 247,000 lf      | 2,500           | \$ 50,000   |
| TOTAL                   |                 |                 | \$ 956,00   |

TABLE 3

EARTHWORK DETAIL  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>                   | <u>Quantity</u> |
|-------------------------------|-----------------|
| Cover Flotation and Moly Area | 50,000 cy       |

TABLE 4

CONCRETE DEMOLITION DETAIL  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>           | <u>Quantity</u> | <u>Manhours</u> |
|-----------------------|-----------------|-----------------|
| Structural Concrete   | 500 cy          | 600             |
| Equipment Foundations | 1,640 cy        | 1,960           |
| Elevated Concrete     | 40 cy           | 45              |
| Thickener Concrete    | 360 cy          | 430             |
| All-In Concrete       | 1,350 cy        | 1,610           |
| Design Allowance      | 630 cy          | 755             |
| TOTAL                 | 4,520 cy        | 5,400           |

TABLE 5

STEEL DEMOLITION DETAIL  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>                 | <u>Quantity</u> | <u>Manhours</u> |
|-----------------------------|-----------------|-----------------|
| Flotation Structural Steel  | 830 st          | 3,340           |
| Molybdenum Structural Steel | 540 st          | 2,170           |
| Miscellaneous Framing Steel | 600 st          | 2,415           |
| Miscellaneous Other Steel   | 60 st           | 240             |
| Reagent Facility Steel      | 33 st           | 135             |
| TOTAL                       | 2,063 st        | 8,300           |

TABLE 6

BUILDING FINISH DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>     | <u>Quantity</u> | <u>Manhours</u> |
|-----------------|-----------------|-----------------|
| Siding          | 86,300 sf       | 1,720           |
| Roofing         | 67,300 sf       | 1,080           |
| Interior Finish | 1 lot           | 500             |
| Office Building | 1 lot           | 200             |
| Laboratory      | 5,600 sf        | 500             |
| TOTAL           | 159,200 sf      | 4,000           |

TABLE 7  
MECHANICAL BULKS DEMOLITION (Tanks)  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>                     | <u>Quantity</u> | <u>Manhours</u> |
|---------------------------------|-----------------|-----------------|
| Ductwork, Chutes and Launderers | 166 st          | 820             |
| Bins and Hoppers                | 44 st           | 220             |
| Shop Fabricated Tanks           | 150 st          | 600             |
| Field Erected Tanks             | 470 st          | 1,880           |
| Other Tanks                     | 120 st          | 480             |
| TOTAL                           | 950 st          | 4,000           |

TABLE 8  
PLANT EQUIPMENT DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>           | <u>Quantity</u> | <u>Manhours</u> |
|-----------------------|-----------------|-----------------|
| Flotation Cells       | 1,050 st        | 5,250           |
| Dryers                | 50 st           | 150             |
| Kiln                  | 100 st          | 500             |
| Mills                 | 400 st          | 2,000           |
| Cranes                | 50 st           | 150             |
| Pumps                 | 100 st          | 500             |
| Thickeners Mechanical | 200 st          | 800             |
| Other Equipment       | 510 st          | 2,550           |
| TOTAL                 | 2,460 st        | 11,900          |

TABLE 9  
PIPING DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>      | <u>Quantity</u> | <u>Manhours</u> |
|------------------|-----------------|-----------------|
| Buildings        | 400 st          | 3,200           |
| Reagent Facility | 30 st           | 240             |
| TOTAL            | 430 st          | 3,440           |

TABLE 10  
ELECTRICAL EQUIPMENT DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>                         | <u>Quantity</u> | <u>Manhours</u> |
|-------------------------------------|-----------------|-----------------|
| Flotation and Molybdenum Facilities | 1 lot           | 5,400           |
| Reagent Facility                    | 1 lot           | 300             |
| TOTAL                               | --              | 5,700           |

TABLE 11  
CABLE TRAYS AND CONDUIT DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u> | <u>Quantity</u> | <u>Manhours</u> |
|-------------|-----------------|-----------------|
| Cable Trays | 6,300 lf        | 250             |
| Conduit     | 102,400 lf      | 1,050           |
| TOTAL       | 108,700 lf      | 1,300           |

TABLE 12

WIRING AND CABLE DEMOLITION  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>    | <u>Quantity</u> | <u>Manhours</u> |
|----------------|-----------------|-----------------|
| Wire and Cable | 246,730 lf      | 2,500           |
| TOTAL          | 246,730 lf      | 2,500           |

TABLE 13

LOADING AND SHIPPING MATERIALS ESTIMATE FOR BOND ESTIMATE  
FLOTATION AND MOLYBDENUM RECOVERY FACILITIES ONLY

| <u>Item</u>       | <u>Quantity</u> | <u>Manhours</u> | <u>Cost</u> |
|-------------------|-----------------|-----------------|-------------|
| Load to Dump      | 1,020 st        | 2,600           | \$ 52,000   |
| Transport to Dump | 1,020 st        | --              | \$ 31,000   |
| Load Salvage      | 5,700 st        | 2,800           | \$ 56,000   |
| Transport Salvage | 5,700 st        | --              | \$399,000   |
| TOTAL             |                 |                 | \$538,000   |